

18

GEOLOGICAL REPORT

OF THE

POTOMAC IRON COMPANY'S PROPERTY,

IN THE STATES OF

VIRGINIA AND MARYLAND.

JUNE 2, 1856.

PHILADELPHIA:

JOHN C. CLARK & SON, PRINTERS, 68 DOCK STREET.

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REPORT.

In submitting the accompanying documents, it is proper to remark that two Geological Reports are presented, in order that united testimony may be afforded on the subject of the mineral lands of the Company. The first is from Dr. James Higgins, who has for the last ten years held, and still continues to hold, the office of State Agricultural Chemist and Geologist of the State of Maryland.

The second is from G. Jenkin Phillipps, Geologist and Mining Agent, recently from the celebrated iron district of Cornwall, England.

A letter from the Hon. D. R. Porter, ex-Governor of Pennsylvania, who has been extensively engaged in the manufacture of iron for many years, and one from Horace L. Brooks, Esq. afford ample and reliable testimony as to the quantity and quality of the iron ore, and the facility with which limestone and fuel can be obtained; also the cheapness of transportation upon the various roads and on the Chesapeake and Ohio Canal. Coal and coke can be brought directly from the mines in Maryland to the bank of the furnace, without transshipment or re-handling.

For a minute description of the property of the Company, reference is made to the accompanying reports and maps.

CHARTER FROM THE STATE OF VIRGINIA.

AN ACT

To incorporate the Potomac Iron Company, in the County of Loudon.

Be it enacted by the General Assembly of Virginia, That John W. Geary, George Rust, Alexander Ray, William B. Dobbin, and Daniel Tyler, and such other persons as may become associated with them in the manner hereinafter provided, shall be, and they are hereby constituted a body politic and corporate, by the name of the Potomac Iron Company, and by that name shall have perpetual succession, and be able and capable to sue and be sued, to plead and be impleaded, in any court whatever, and may use and have a common seal, and may alter and renew the same at pleasure: and the said body corporate shall have all the powers, faculties, franchises and rights, necessary and proper for carrying on the manufacture of iron in all its various branches and uses in the said County of Loudon, and for the mining of ore and coal, and the beneficial management of its property, and for the transportation of their proceeds, issues, products, and manufactures, to market, and shall have power and authority to purchase, lease and hold any property, real, personal and mixed, which may be deemed by said Company necessary for its purposes: *Provided, however,* that said Company shall not, at any one time, actually hold, as owner thereof, more than twenty-five thousand acres of land in the State of Virginia.

And be it enacted, That the capital of the said Company shall be two millions of dollars, divided into twenty thousand shares of par value of one hundred dollars each: And whenever five thousand shares shall have been actually subscribed in land or money, the said Company shall be authorized to organize and act as a body corporate, and the president and directors of said Company shall have power and authority, at any time thereafter, and without opening anew books of subscription, to receive further subscriptions from time to time, until the full number of shares shall have been subscribed, and payment be made of the whole or any part of the subscription obtained or received in lands or other property or money as may be agreed on.

And be it enacted, That at all meetings of the stockholders of the said Company, each share of stock shall entitle the holder thereof to one vote, to be given in person or by proxy, and said shares shall

be considered as personal property, and shall be transferable in such manner as may be provided by the by-laws of said Company.

And be it enacted, That the affairs of the said Company shall be managed by the persons named in the first section of this Act, and who are hereby constituted directors of said Company until directors shall be elected as hereinafter provided; and in case of the decease of one or more of said persons, or in case of the refusal of any one or more of said persons to act as directors, a majority of the remaining persons shall have power to select other persons as directors for the time being, in their stead.

And be it enacted, That whenever the said Company shall be organized, before proceeding to the prosecution of its business, a general meeting of the stockholders thereof shall be held at such time and place as the directors for the time being may appoint, and of which reasonable notice shall be given in some newspaper printed in Loudon or Alexandria; and that at such meeting not less than nine persons, or more than thirteen, all of whom shall be stockholders of said company, shall be chosen as directors of said Company, to serve for one year thereafter, and until the next election shall be held; and that annually thereafter, like previous notice being given, a general meeting of the stockholders shall be held for the election of directors for the succeeding year, and if, from any cause, it shall so happen that an election shall not be made on the appointed day, the said Company shall not be deemed, for that cause, to be dissolved, but such election may be afterwards made on any day which may be appointed for that purpose by the directors for the time being, notice thereof being given as aforesaid; and the said directors of said Company shall have and exercise all the powers and authority given to them by this act, and such other powers and authority not inconsistent with the provisions of this act, as may be conferred upon them by the resolutions and by-laws of said Company: *Provided always*, that such resolutions and by-laws shall not be repugnant to the constitution of this State or of the United States.

And be it enacted, That the directors of said Company shall select one of their number president of said Company, who shall have such powers and authority, and perform such duties as may be prescribed by the directors and by-laws of said Company; and the said directors shall have power to appoint and remove all officers, agents and servants of the said Company, to manage and conduct all its business of any kind, to borrow money at any time, and from

time to time, as in their judgment the exigencies of the Company may require, and to execute, if deemed by them necessary and expedient, any bonds or coupon bonds, deed or deeds of mortgage, as security for the fulfilment, by the said Company, of any of its contracts or other liabilities.

This act shall be in force from its passage, and shall be subject to any amendment, alteration or modification, at the pleasure of the General Assembly.

STATE OF VIRGINIA, }
City of Richmond, } *to wit.*

I, St. Geo. Tucker, Clerk of the House of Delegates, and Keeper of the Rolls of Virginia, do certify that the foregoing is a true copy of an act passed March 12th, 1856.

Given under my hand this 13th March, 1856.

S. G. TUCKER, C. H. D.

And Keeper of the Rolls of Va.

CHARTER FROM THE STATE OF MARYLAND.

A Bill, entitled, an Act to incorporate the Potomac Iron and Bridge Company.

Whereas, George Rust, John W. Geary and Alexander Ray, have been, under an act of the Legislature of the State of Virginia, constituted a body corporate, under the name and style of the Potomac Iron Company: *And whereas*, the lands and property of the said Company are located in Loudon County, in the State of Virginia, which said County is divided from the State of Maryland by the Potomac river; *And whereas*, the said Company is desirous to hold and enjoy certain property for its uses in the State of Maryland, and to connect the said property, so as aforesaid situated in Loudon County, with certain property now owned by John W. Geary, one of the persons incorporated by the name and style of the Potomac Iron Company, as aforesaid; and to hold said property in Frederick County, as aforesaid; and to do other acts to carry out within the limits of the State of Maryland, certain of the powers conferred upon the said Company within the State of Virginia; Therefore,

SECTION 1. *Be it enacted by the General Assembly of Maryland*, That the said George Rust, John W. Geary and Alexander Ray are hereby constituted and declared to be a body corporate under the name and style of the Potomac Iron and Bridge Company.

SECT. 2. *Be it further enacted*, That the said Potomac Iron and Bridge Company shall have power to purchase and hold five thousand acres of land within the State of Maryland, and to connect the land owned by the Potomac Iron Company in the State of Virginia, with the land held by the Potomac Iron and Bridge Company in Frederick County, in the State of Maryland, by a bridge.

SECT. 3. *Be it further enacted*, That the said Potomac Iron and Bridge Company shall have the power to construct a rail road of not more than one quarter of a mile in length, to connect such furnaces as may be erected on the said land, with the rail road of the Baltimore and Ohio Rail Road Company, provided that the said rail road is constructed upon the lands owned by the said Potomac Iron and Bridge Company.

SECT. 4. *And be it enacted*, That this act shall take effect from its passage.

By the House of Delegates.

March 10, 1854.

This engrossed bill, the original of which passed the House of Delegates, by yeas and nays, on the 10th day of March, 1856, read and assented to.

By order,

TH. H. KENT, of Jos.
Clerk.

*The
Great Seal of
the State.*

T. W. LIGON.

By the Senate.

March 10, 1854.

This engrossed bill, the original of which passed the Senate, by yeas and nays, on the 8th day of March, 1856, read and assented to.

By order,

C. HARWOOD,

Sec'ry.

Maryland, sct.

I, WILLIAM A. SPENCER, Clerk of the Court of Appeals of Maryland, do hereby certify that the foregoing is a full and true copy of the Act of the General Assembly of Maryland, of which it purports to be a copy, as taken from the original engrossed Bill, deposited in and belonging to the Office of the Court of Appeals aforesaid.

In testimony whereof, I have hereunto set my hand, as Clerk, and affixed the Seal of the said Court of

[SEAL.] Appeals, this 27th day of May, A.D. 1856.

WM. A. SPENCER,

Clerk Court of Appeals, Maryland.

REPORT OF DR. JAMES HIGGINS,

State Agricultural Chemist of the State of Maryland.

TO COL. JOHN W. GEARY.

Sir,—A full and careful examination of the property of this Company enables me to furnish you with the following report as to its resources and local advantages. The tract of land owned by the Company contains about six hundred and thirty-six acres—of this there is a fair proportion of mountain woodland, and the balance farm land of good quality, producing fair returns of all the crops usually cultivated in this fertile and populous section of the country.

It is situated in Loudon County, Va., on the banks of the Potomac, directly opposite to the point of rocks, a depot and station of the Baltimore and Ohio Rail Road, to which it has access by a well built road with a heavy T rail, over a wide and substantial bridge. Belonging to this Company are several lots in Maryland, between the rail road and canal, suitable for furnaces, forges, or rolling mills.

The great value of this property depends on its immense deposits of iron ore, which are chiefly confined to the eastern part of the property, and cover an area of about two hundred acres in one body. These two hundred acres begin at the Potomac river, and occupy a hill extending to the south. The quantity of the ore, the facilities for its mining, and convenience to market, place its value far above any other deposit that I have examined myself, or have become familiar with from the reports of others.

At the Potomac river there is an opening which exposes the bed of ore in almost one continuous mass, extending from a few feet of the surface to depths not yet ascertained. In a great part of this opening the ore has to be blasted, each blast throwing down many tons of pure rich ore, leaving an exposed surface several feet in thickness, and extending horizontally as far as excavations have been yet made. Many openings in other parts of the iron tract show the ore to exist in the same position, and in immense quantities, being found either in small masses, *closely* compacted and easily taken out with the pick, or in large blocks of many tons weight, which have to be obtained by means of boring and blasting. On the eastern side of the ridge several small openings were also examined, all *demonstrating* the existence of the ore in large quantities near the surface, and capable of being brought out with very little labour. On the west side of the hill two excavations have

been made about forty feet in depth, from which large quantities of the ore (about 1,200,000 tons) have been mined; and this section of the ridge confirms all that I have before spoken as to its great abundance, of which no one can form an adequate idea, save by personal inspection. Although prepared by previous reports to see a great development of mineral riches, I had formed but a very imperfect idea of their extent, before examining the different openings, outcrops, and surface developments, on the property. From the evidence of all these, I believe that enough ore can be readily obtained here to keep a dozen furnaces in operation during the present century. This belief is founded not on statements made by others, but from careful observations made by myself at the opening on the north side near the river; at that on the west side next the mountain, which though forty feet in depth, has, like the first named, an almost solid bed of ore for its floor; from several openings at different places and at different heights on the eastern side; from surface in view and from numerous out crops on the whole extent of the two hundred acres comprising the Iron Hill or Iron Ridge.

Facilities for mining, The preceding description shows that this can be done with *very little* expense, in consequence of the ore bed occupying a hill from its base to its summit and being covered by only a few feet of earth. Open drifts can be made at any part which discharge their water by natural flow. Rail road switches with a slight grade to the B. and O. R. R. or Chesapeake and O. Canal can be made to any part of the property on which cars are loaded, and the ore therefore carried away without any transshipment to wherever it may be needed.

Local advantages.—These are equal at present to any in the country. The ore deposits are not distant more than one mile from the Baltimore and Ohio Rail Road, and the Chesapeake and Ohio Canal. These two works, at present, afford the most ample facilities for the transportation of the ore to market in its natural state, and for the obtaining of coal for its reduction and the manufacture of iron on the premises. Other works of improvement already projected, will afford additional market and manufacturing facilities, viz.—The Metropolitan road to Washington, 40 miles; a rail road to Hagerstown twenty-five miles, there connecting with the Cumberland Valley R. R. which will bring the anthracite coal region of Pa. within one hundred miles; and a rail road connecting the B. and O. R. R. at the point of rocks with the Alexandria, Loudon and

Hampshire Road, eleven miles, by means of which a full connection will be had with all the southern sections of the United States.

Character of the ore.—This will be best seen by the following analysis of two average samples.

Analysis of two specimens of Iron Ore from the Potomac Iron Company.

BROWN HAEMETITES.

		Earthy.	Massive Stalactitic.
Peroxide of iron,	- -	71.29 per cent.	82.44 per cent.
Oxide of aluminum (clay),	-	2.30 „	1.51 „
Carbonate of lime and magnesia,		0.09 „	0.04 „
Phosphoric acid,	- -	1.03 „	0.33 „
Sand,	- - - -	11.57 „	2.83 „
Water,	- - - -	14.01 „	13.50 „
		100.29	100.65
Yield of metallic iron,	-	49.92 „	57.73 „
Phosphorus,	- - -	0.46 „	0.14 „

The above samples were analyzed as they came from the mine. They contain no sulphur which is very injurious and very common in iron ores, and not enough of phosphorus to interfere with the malleability and ductility of the iron, which is therefore fit for any purpose for which iron made from the best Swedish ores is applied.

Many ores which in their published analyses show no phosphorus yet actually contain much greater quantities than the above. The art of analysis being so much improved in the last few years as to be able to *estimate* accurately quantities of phosphoric acid which before escaped *detection*.

Other resources.—Abundance of limestone is very conveniently located for fluxing the ore. Large quantities of stone for building purposes with good brick fire and potter's clay also are found; these, with chesnut and other timber, add greatly to the intrinsic value of the property.

The location is very healthy, and amply supplied with the water necessary to large furnace or forge operations. From a review of the advantages possessed by this property, viz. the immense quantities and fine quality of the ore; the cheapness with which it can be mined, the facilities for transportation, its proximity to market, (freight being less than one dollar a ton to tide water), I can as-

surely say, that if the iron business cannot be profitably conducted here, then the profitable working of iron cannot be carried on in this country, and we must look for supplies from foreign sources.

JAMES HIGGINS,

State Agricultural Chemist of Maryland.

STATE OF MARYLAND—to wit:

I, T. Watkins Ligon, Governor of the State of Maryland, do hereby certify that James Higgins, who has signed the annexed report, is, and at the same time of so doing was, Agricultural Chemist for the State of Maryland, duly commissioned and sworn, and that full faith and credit are due and ought to be given to his acts as such.

In testimony whereof, I have hereunto set my hand and affixed the Great Seal of the State of Maryland, on
[L. s.] this ninth day of May, in the year of our Lord one thousand eight hundred and fifty-six.

By the Governor,

T. WATKINS LIGON.

NATHANIEL COX, *Secretary of State.*

REPORT OF G. JENKIN PHILLIPPS,

Geologist, &c.

COL. JOHN W. GEARY.

Sir,—In obedience to your instructions, I have made a geological examination of the ore bank and other property owned by the Potomac Iron Company, in Loudon County, Virginia.

In the examination thereof, I acquired a thorough knowledge of its structure and formation. The results obtained from my investigations are hereby submitted.

This estate lies directly on the Baltimore and Ohio Rail Road, and on the Chesapeake and Ohio Canal. It is distinguished for its facilities for transportation to the cities of Washington, Alexandria, Wheeling, and the numerous flourishing towns and villages, through which those improvements pass. Distance from Washington forty miles, from Baltimore sixty-nine miles, from Alexandria forty-five miles, by the Alexandria, Loudon, and Hampshire Rail Road; and from Washington by the Metropolitan Rail Road, forty miles. The Metropolitan Rail Road is located from Washington

City via Georgetown and Rockville, to Point of Rocks, terminating or connecting with the Baltimore and Ohio Rail Road, on the lands of the Company. This road will soon be constructed, and will afford a direct rail road route to Washington.

A rail road has been recently chartered by the Virginia and Maryland Legislatures, connecting the Baltimore and Ohio Rail Road at Point of Rocks, with the Alexandria, Loudon and Hampshire Rail Road at Leesburg; passing directly through the lands of the Company, affording a valuable connection with the more southern rail roads of Virginia.

With great confidence you can look forward to the speedy connection of the Cumberland Valley Rail Road, already completed and in operation from Harrisburg, Pennsylvania, to Hagerstown, Maryland, with the Baltimore and Ohio Rail Road, at some point not far distant from the Company's lands, by which a direct communication will be opened to the anthracite coal regions of Pennsylvania, and a profitable exchange of ores and coals can be made.

I would remark there are good county roads from "Point of Rocks," much travelled. The one to Leesburg passing through the Company's lands, has two daily lines of stages each way upon it.

There is a substantial well built bridge across the Potomac, between Maryland and Virginia, connecting the Company's lands. It is 1360 feet long, and cost about sixty thousand dollars.

Across this bridge, is constructed a double track rail road, belonging to the Company, connecting their mines with the Baltimore and Ohio Rail Road, over which the cars of the latter pass to the mines, and improvements of the Company. It is also used for the convenient loading of the boats on the Chesapeake and Ohio Canal, with the products of the Company's mines and manufactories.

The property of the Company at this place, embraces 636 acres of mineral, agricultural, and timbered lands. Above these mineral resources, lies a soil naturally fertile and susceptible of high cultivation.

This tract is covered with a fine growth of young timber, extending over an area of upwards of four hundred acres, consisting chiefly of chesnut, walnut, white oak, hickory, &c.

The country is picturesque, and from the mildness of the climate, there are comparatively few impediments offered to mining and commercial business, either in summer or winter.

I most respectfully submit these few introductory remarks, relative to the general appearance of the country, its rapid increase in

population, the great activity in all the various branches of business, and they may not be out of order.

Great as are the claims of these lines of rail ways, in facilitating agricultural and commercial purposes, still greater will be their advantages in developing the geological resources, and turning to account the vast mineral wealth of this region.

The ruggedness and wildness of this breach in the mountains afford every evidence of the most violent convulsions, dislocations and upheavings of nature.

From the top of the mountain, you have a most beautiful view of the surrounding country on all sides. The lands are very fertile and are in a high state of cultivation, affording wealth and happiness to a densely populated neighbourhood.

The vast mineral resources and the general agricultural and commercial advantages of this region, have been in a great measure for a long period overlooked, but the time has now come when capitalists can no longer be blind to their own interests in overlooking such untold mineral wealth.

The cost of developing and bringing the same into market will be but a moiety in comparison with the nett results which most assuredly, under proper management, could not fail to be realized.

The haemetite ore bank, is one of the most valuable, and most extensive mineral deposits of that nature, found in this country. It presents to the scrutinizing eye of the geologist a spectacle literally unsurpassed and overwhelming. The ore is of excellent quality and is inexhaustible.

The hill containing the ore, is upwards of 250 feet above the water level of the river, and from that level to the crest of the hill is found a solid mass of rich haemetite ore. The area of the surface of this hill is about 200 acres. The mines free themselves from water.

The time is not far distant when this property will be spread over with furnaces, forges, foundries, rolling mills, &c.

There are found in different locations, but in sufficiently close proximity for use, the iron ore, the limestone for flux, and fire clay for constructing the interior brick work of furnaces, &c. This clay is mined and made into bricks on the spot.

The amount required will by no means be large to develop the resources of this location, and by the association and proper investment of capital, with proper management, it will most certainly yield the largest average income on the sum invested.

The canal and rail roads, stretching out their numerous connections for hundreds of miles, facilitating the transportation of the products and materials manufactured, make this an important point for establishing and conducting the manufacture of iron in all its various uses and branches.

In making an examination of the ore bank, and of the adjoining lands, I readily came to the conclusion that it was an upheave of nature, casting up, with an unstinted hand, inestimable quantities of her most valuable mineral treasures, and at the same time affording a subject for reflections most interesting to the scientific mind.

Catastrophes, either aqueous or igneous, are the means by which the earth's surface has been torn asunder, and all the various strata have been opened to our view, from which, by analogous comparisons, we may arrive at correct conclusions. We find the earth upheaved—dry land inundated—parts of the ocean drained and blown out into vast conical piles. We are greatly indebted to this disturbing agency, from the fact that nearly all valuable metals, when in their natural positions, are found at great depths, and could not readily be discovered; for it is owing to these elevations, dislocations and overturnings, that access has been given to deposits of useful and valuable mineral substances.

From the lights thus obtained upon the subject of heaves and eruptions, this would be a probable and proper conclusion with regard to this ore bank, that it has been forced up to its present position from unknown depths below. It bears the strongest and most marked evidence of some such powerful influence.

It is doubtlessly proper for me to speak upon the subject of this ore bank somewhat more in detail. I again repeat, that as to the extent and excellent quality of the iron ore, its accessibility, the ease with which it can be mined, and its great value, I have not a parallel to offer. Four series of operations, as cross cuttings, have been carried on in the prospecting and operations of this bank; two openings east and west, and two north and south, at a width of about ninety feet, and three hundred and fifty feet in length. Another excavation near the river shows the ore to extend in a solid mass from the crest of the mountain 250 feet in depth, which is the deepest part of the mine yet seen.

None of the workings have penetrated to a greater depth, but the ore makes its appearance in the bottom of the river considerably lower. It is impossible to say certainly to what depth the ore continues, but I hazard nothing in saying that it may be thousands of

feet. The ore increases in richness as it increases in depth. It is pure, not being corrupted with any other mineral, and can be mined at an exceedingly cheap rate, *and under proper mining arrangements*, the cost would not exceed twenty-five cents per ton.

The indications of ore are very great upon the surface; large blocks lie promiscuously upon the top of the ground, and nearly everywhere the surface itself would make iron. These indications, together with others associated, guaranty the whole mountain to be a mass of mineral.

This haemetite has a brown red colour, is compact, and often very hard, its surface can be filed and polished, so as to acquire a lustre almost metallic, its internal structure is fibrous, and it exhibits the appearance of splinters of wood. Its outer surface is mamelated, and presents occasionally sections of a sphere, or cylinders attached to each other.

Brown oxide of iron, or brown iron ore predominates in the upper parts of the mountain, underneath it is without any shade of red, which passes sometimes into the blister brown, or velvet black, it becomes brown at the blow pipe, it is properly hydrated oxide of iron, this is often found in globular, uniform, stalactitic, and furticose shapes. Carbonate of iron, (sparry iron,) is associated with the haemetite, it has a sparry and lamellar fracture with a colour varying from yellow gray to Isabella yellowish, its crystals are susceptible, containing variable quantities of carbonate of lime, which pass wholly into this mineral, it belongs to the primitive formation.

This ore viewed as a metallurgic object is one of the most interesting and valuable that is known. It affords natural steel without mixture with the greatest facility. Owing to the particular quality of the iron, it possesses a marked excellence, and it is often called steel iron ore.

With regard to an analysis of this ore I beg to remark, that a sample of the ore was assayed some considerable time ago, which yielded forty-nine and fifty-seven hundredths of metallic iron, but this must have been an inferior sample, as I have taken from the ore bank a *fair average sample* of brown haemetite, and another of crystalization. The following is by assay.

Brown Haemetite 57 per cent. of metal iron.

Crystalized stalactites 66 per cent. of metallic iron.

The estimated consumption of iron in the United States last year was not short of 1,500,000 tons, of this amount the United States produced about 1,000,000 tons, hence 500,000 must have been im-

ported from other countries. Notwithstanding the great expense in the development of minerals in England, her merchants can find purchasers, and make their own fortunes by the trade, in this country, where ore is equal in quality, and with about half the expense in developments.

I need not dilate upon the uses of this metal, as they are well known. The basis for its consumption is every day becoming more wide and extensive. The quality of the iron manufactured from your ores cannot be excelled for general purposes.

I submit the following estimate of the cost of manufacturing a ton of pig iron, at the Company's works.

2½ tons of ore,	-	-	-	-	\$1.25
2 tons of eoke,	-	-	-	-	8.00
1 ton of limestone,	-	-	-	-	50
Labour, managers, &c.	-	-	-	-	2.75
Incidental expenses,	-	-	-	-	1.00
Cost per ton,	-	-	-	-	\$13.50
Present value of a ton of iron,	-	-	-	-	\$25.00
Deduct expenses of manufacture,	-	-	-	-	13.50
Leaves a profit of	-	-	-	-	\$11.50

Suppose a furnaee to make one hundred tons per week, and say work forty weeks in the year.

Then, 100 tons $\times$ 40 weeks = 4000 $\times$ \$11.50 profit, the annual profit will be \$46,000. The Company will receive its coal and eoke from the Georgia Creek Valley, the eentre of the Cumberland coal basin, the purity and excellence of which is well known throughout the eountry for manufacturing and other purposes. The Chesapeake and Ohio Canal, and the Baltimore and Ohio, and Alexandria, Loudon and Hampshire Rail Roads, form the connecting links, upon which eoke can be delivered at a cost not exeeeding three dollars and fifty cents per ton, the Company owning the coal mines, and manufacturing their own eoke. Or, if it be deemed desirable to manufacture iron with anthraeite coal, it ean be procured from the Pennsylvanian coal fields, (see maps) via the Cumberland Valley Rail Road from Harrisburg, at a cost not exeeeding \$4.50 per ton deliverable at the Company's works.

I will introduce an estimate for improvements commensurate with the circumstances of the case. For erecting six blast furnaces of fifteen feet bosh each, and putting them in working order, the amount of							
-	-	-	-	-	-	-	\$200,000
Erecting rolling mill and foundry,	-	-	-	-	-	-	150,000
Houses and other improvements,	-	-	-	-	-	-	50,000
Total cost of improvements,							\$400,000

Estimated results of the foregoing Operations.

Products of the six furnaces at 120 tons each per week for forty weeks in the year = 28,800 tons at a net profit of							
\$10.00 per ton,	-	-	-	-	-	-	\$288,000
Profit of foundry and rolling mill,	-	-	-	-	-	-	50,000
Profit of mining and sale of ore,	-	-	-	-	-	-	30,000
Total,							\$368,000
30 per cent. on \$1,000,000 is	-	-	-	-	-	-	\$300,000

Which leaves for contingent or sinking fund, - \$68,000

In addition to the great advantages, greater than any other with which I am acquainted, are your rail roads, canals, stage roads, &c. which I consider of incalculable importance, and render it the best site for such works in the United States. Freights to tide water will not exceed \$1.00 per ton.

Having concluded the preliminary remarks on the extent and resources of this estate, I will now speak of the geological position and superior facilities of the same. The town of "Point of Rocks" will undoubtedly soon become a flourishing place, and be of great importance; when the whole country will reap no small advantages from the mining and other operations. Enough of facts have been presented in the foregoing description of the Company's mineral and other lands to convince every one of their value.

I have deposited a few specimens of the ore, clay, green earth, &c. from your property in my office, where they can be seen and examined by any persons desirous of so doing.

Green Earth.

This earth is found in abundance, occurring in open beds, its colour is somewhat bluish, or grayish green, and varies to blackish

green, it is very fine grained, and is very unctious to the touch, generally known as "mountain green of artists," properly ground with oil it is employed to mix with paint; this I consider to be of great value and importance. The value of which is not generally known. The white clay would make a most excellent quality of procelain ware. It is perfectly *white* and well adapted for that purpose. It has no superior as a fire clay. It covers a number of acres and varies from 10 to 20 feet in thickness, and is near the surface.

Copper.

The Cotoctin mountain entirely separate and distinct from the iron ore deposits presents strong indications of copper, especially on the east side where the carbonate is strong; on the other side near the Cotoctin creek, several specimens of good yellow sulphurate of copper have been picked up.

The ore is of high per centage. I judge from the indications at surface, the lode to be of considerable size and value.

Gold Quartz.

In many parts of this estate granular quartz are disseminated, together with micaceous specular iron which form a portion of a mica slate district, including a considerable quantity of native gold in spangles, which in these rocks replace mica, or is implanted on the sides of fissures, or disseminated in veins, or under the shape of filaments or crystalized twigs.

In these quartz, the precious metal occurs either in a visible or invisible form, and though invisible either fresh pyrites become visible by its decomposition as the hydrated oxide of iron allows the native gold particles to shine forth on their redish brown ground, even when the precious metal may constitute only a very small part of its weight. This is the character of quartz in your lands.

Building Stone.

There is any quantity of very superior building stone, such as free stone, blue stone, and variegated stone, the latter is susceptible of a high polish.

Not far from the Company's lands, upon the Baltimore and Ohio Rail Road, there is a fine profitable blue slate quarry, from which is manufactured excellent roofing for houses.

It is proper here to observe that I have carefully endeavoured to avoid the redundant use of geological terms, which are sometimes calculated more to bewilder, than enlighten the general reader.

My object therefore is apparent in endeavouring to set forth the evidence and results of my researches in such manner as will be most easily understood.

In conclusion, without being in haste, or over sanguine, in expressing my opinion in regard to the value and importance of these mines, I have endeavoured to be particular, and it is with the greatest satisfaction and pleasure, I am able to pronounce the Potomac Iron Company's estate to be emphatically the best mineral property I have examined, and must congratulate the Company on their operations and undertakings, believing the mines to be inexhaustible in mineral treasures, and that a success unparalleled in the history of this country awaits you in their proper development.

G. JENKIN PHILLIPPS,

Geologist, Surveyor, &c.

General Mining and Geological Office, Philadelphia.
81 Walnut Street.

April 29, 1856.

LETTER FROM THE HON. DAVID R. PORTER, .

Ex-Governor of the State of Pennsylvania, in relation to the Property of the Company.

Harrisburg, Pa. 30th April, 1856.

Dear Sir,—In relation to the estate called “the Potomac furnace,” in Loudon County, Virginia, I have to say, that I visited that place in the year 1842, and examined it with some care, with the view to purchase it. I was there again in the summer of 1854, and traversed the ore land and inspected the mines minutely. There are about 630 acres in the tract, but the ore, I think, is embraced in about 200 acres of it. It has been opened down near the margin of the river, with a very good appearance—the ore is indeed clearly visible in the bed of the river at low water. It has been opened more extensively on the top of the hill, at a height of perhaps 250 feet above the river, and at several other places around the hill, and is, in my opinion, decidedly the most extensive, reliable, and best body of brown haematite iron ore that I ever met with

anywhere. There is a neat ordinary charcoal furnace on the premises, with steam power, pretty well got up, with buildings nearly sufficient for carrying on a furnace of that description. There is, on the opposite side of a ravine from the ore, a fire clay of good appearance, which is used to some extent in the manufacture of fire brick, which have been pronounced very good. Limestone of good quality is abundant. There was a large sized furnace in the course of construction designed for the use of coke, when I was last there. There is a rail road, of about three-fourths of a mile long, laid with a good substantial T rail, connecting the mines with the Chesapeake and Ohio Canal, at "the Point of Rocks," and connecting also with the Baltimore and Ohio Rail Road at the same place. There is a large space of ground for wharfage on the canal, and the trestle work for dumping into boats and other cars on the Baltimore and Ohio Rail Road, is constructed with judgment and every apparent regard to convenience and saving of labour. The distance from Baltimore by rail road is 69 miles, and some 40 miles by canal from Washington City. Bituminous coal and coke are brought from the mines near Cumberland, without transshipment or handling, to the furnace; and the ore, of very fine quality, may be obtained from the mines by barrows and carts, at the tunnel head, and that for ages to come. Anthracite coal can be delivered from the Pennsylvania mines at a moderate cost. Pig metal is carried in great quantity from Baltimore to Wheeling, past this point, at *one and a quarter cents* per ton per mile, and the freight on this most admirable canal is equally low. A charter was obtained for a rail road from this place to connect (by 11 miles) to another rail road near Leesburg. Another is projected from this point to Hagerstown. So that, take it all in all, this property seems to me to be the most eligible for manufacturing iron with coke or anthracite, that is to be found anywhere.

Very respectfully yours,

DAVID R. PORTER.

LETTER FROM HORACE L. BROOKE,

Proprietor of Shannondale Furnace, Va.

Shannondale Furnace, 6th May, 1856.

COL. J. W. GEARY,

Dear Sir,—I have examined the immense mineral resources contained in your property in Loudon County, Va., and from a perso-

nal knowledge I can say that it is most certainly one of the largest haematite iron deposits in the United States; and considering the cheapness of mining, together with the improvement you have made by connecting the ore bank by railway, with the Baltimore and Ohio Rail Road, and Chesapeake and Ohio Canal, at Point Rocks, also the mere trifle that limestone costs there for a flux, I firmly believe that a company properly organized, with sufficient means to erect blast furnaces, and conduct them in connection with a rail mill, could successfully compete with any other iron works in this country in the manufacture of iron.

I can speak very favourable in regard to the quality of the ore, when manufactured with charcoal. As I have never used coke in smelting it, my remarks are confined to its manufacture with charcoal. In order to test thoroughly your ore, I burdened my furnace with it alone, which pig iron I had converted into boiler blooms at my forge, and marked P. R. When sold, I made a particular request of the Company who purchased to test them, and inform me of their quality, which they did, and reported very favourably indeed of them. I also cast a forge hammer from furnace when running on your ore, which has been very severely tested by eighteen months' work, and is at present as perfect as when cast, which is a very satisfactory proof to me that the ore will make a good quality of foundry iron. My furnace worked well on it—it took less stock to smelt, and less limestone to flux, than any other ore I have used.

Yours truly,

HORACE L. BROOKE.

BY-LAWS

OF THE

POTOMAC IRON COMPANY,

Incorporated under the Act of the General Assembly of Virginia and of Maryland, passed at the Session of 1856.

1. The stock property and concerns of the said Company shall be managed by not less than nine or more than thirteen Directors, to be annually chosen from the Stockholders. And the annual meeting of the Stockholders for the election of Directors shall be held on the second Monday of May, at the office of the Company

established for the accommodation of its business. And if it shall happen from any cause that an election of Directors shall not be made on the day designated as aforesaid, the Stockholders present, if any, may adjourn to meet at the same, or a different place on some future day, and if necessary may adjourn again and again, until a business quorum in person, or by proxy, shall be in attendance. And at the first meeting after the day designated, as aforesaid, for the regular annual election, (in case of a failure to elect new Directors on that day) whether such meeting be an adjourned meeting or otherwise, at which a business quorum of the Stockholders shall be represented, either in person or by proxy, they shall proceed to a new election of Directors; provided always, that the like notice of the time and place of holding such election be published as is required by the aforesaid Act of Incorporation, in regard to the time and place of holding the regular annual election.

2. At the same meeting at which the Stockholders shall make an election of Directors, and immediately thereafter, they shall also by election, designate from the number of such Directors a President of the Company. And when any vacancy shall happen amongst the Directors by death, resignation, or otherwise, it shall be filled by the election of a new Director, to be made by the Stockholders at their first meeting after such vacancy. And for the purpose of filling any such vacancy, or for any other purpose relating to the affairs of said Company, other than such purposes as are provided for in the foregoing by-law, special meetings of the Stockholders may be held at any time and place, of which no other notice shall be required than such as may suffice to bring together at the earliest day a business quorum of the Stockholders.

3. A majority in interest of the Stockholders when present at any meeting, either in person or by proxy, shall constitute a quorum for the transaction of business; and when in session their power and authority shall be paramount to the power and authority of the Directors. And they may remove at pleasure the President of the Company, and designate a new President; or if the office of President shall become vacant from any cause when the Stockholders are not in session, they shall at their first meeting thereafter designate a new President; and until such vacancy shall be filled, the Directors shall designate one of their number to act as President pro tempore, until the Stockholders shall designate a President—such President to be always designated from the number of Directors.

4. The subordinate officers of the Company shall consist of a

Superintendent, Treasurer, and Secretary, who shall be appointed by the Directors, and hold their offices at the pleasure of the Directors; but any of the Directors shall be eligible to any or all of said offices. And whenever any of said offices shall become vacant from any cause, they shall be filled by new appointments to be made at the discretion of the Directors.

5. At all meetings of the Directors, a majority of the whole shall constitute a quorum for the transaction of business; and there shall be four meetings to be held regularly every year, on the second Mondays of January, May, July and October, at the office of the Company, such meetings to be denominated the regular meetings of the Directors, and to be held without any other notice than that contained in this by-law. Special meetings may be held at any time and place, upon the call of the President, or any two of the Directors, to be made known either verbally or by letter. But other special meetings may be held at such times and places as may be prescribed by resolution or motion, to be adopted at any previous meeting, of which no other notice shall be held necessary than the adoption of such resolution or motion. And at both the regular and special meetings, adjournments may be made from day to day, or to any future day, if there be any motive for it. But a failure to hold any regular meeting for want of the attendance of a business quorum of the Directors, shall work an adjournment of such meeting until the day appointed for the next regular meeting.

6. The Directors shall have power to carry on the business of manufacturing of iron in all its uses and branches, mining and selling ore, and any other kind of business for the benefit of the Company, within the objects and purposes of the Company, in such manner and to such extent as to them shall seem most likely to yield the largest profit upon the capital invested. And they shall have control of all the property of the Company—its business affairs and operations—its subordinate officers, agents and servants.

7. The Stockholders in general meeting, or a majority thereof, shall have power to amend, alter, or repeal, or to make new by-laws at pleasure.



